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Job Skills Education Program: Semi-Annual Technical Report

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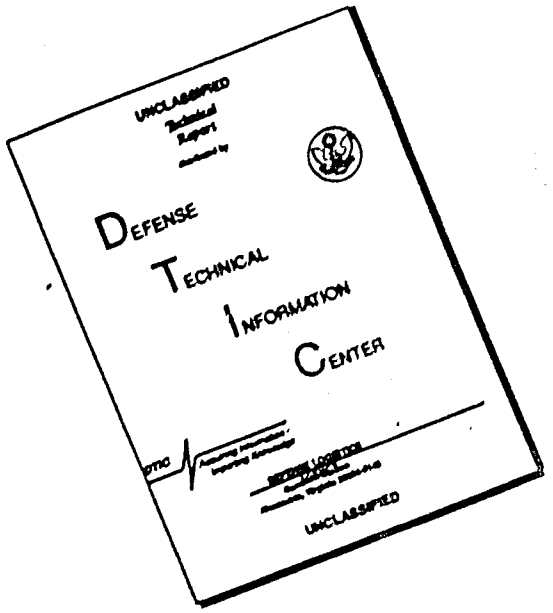

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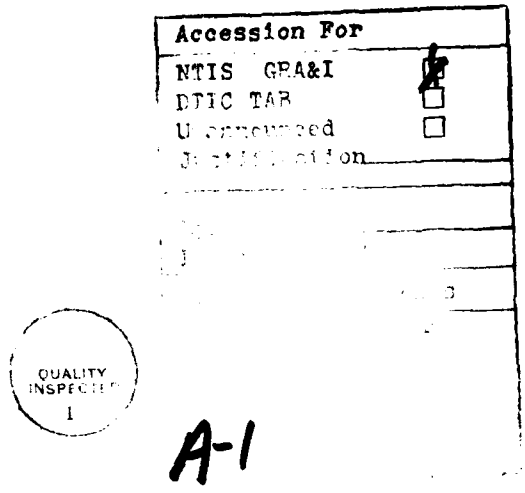

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18. SUPPLEMENTARY NOTES

Beatrice J. Farr, contracting officer's representative. This report, together with RNs 85-22, 85-37, 85-40, 85-41, 85-42, 85-43, 85-44, 85-45, and 85-46, forms part of a series on the Army's Job Skills Education Program (JSEP).

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

CBI
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Job Skills Education Program (JSEP) is designed to provide soldiers with the prerequisite knowledge and skills required for successfully learning their Military Occupational Specialties (MOS). When the JSEP is put into effect, it will replace the Army's current Basic Skills Education Program (BSEP) with a sophisticated, computer-based system.

The second phase of the three-phase JSEP contract involved planning for the implementation and development of computer-based instruction (Continued)

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20. (Continued)

(CBI), and a field trial of that instruction. The results of the field trials and discussions of methods for management and development are contained in this report.

FOREWORD

The Job Skills Education Program (JSEP) is a multi-phase program begun in Fiscal Year 1982, and designed to enhance enlisted career potential by improving soldier job performance. The sponsor, the Education Division, Office of the Deputy Chief of Staff for Personnel, expects JSEP to replace the Army's current Basic Skills Education Program when it is implemented.

The JSEP program, being developed by Florida State University (FSU) will result in a standardized curriculum for soldiers who demonstrate deficiencies in the knowledge and skills required to successfully learn their Military Occupational Specialty (MOS).

In accordance with current policy, JSEP will be an on-duty program. It will also use a computer-based management system to facilitate an open entry/open exit approach. At present, most of the lessons being developed will be computer delivered; however, the plan calls for using existing materials, and incorporating materials developed as part of other ARI efforts, whenever appropriate.

A unique aspect of JSEP is that it builds upon a very detailed front-end analysis of MOS Baseline Skills. The analysis covered tasks performed by soldiers in the 94 highest density MOSs, in addition to Common Tasks (the skills that all soldiers, regardless of their MOS, need to know). Although the Army has over 300 MOSs, the 94 covered in the analysis represent about 80% of all soldiers. Perhaps the most useful product developed for the analysis was a taxonomy listing more than 200 prerequisite competencies.(P.C.) for these MOSs. The competencies were derived from detailed reviews of Soldier Manuals, and from extensive interviews with subject-matter experts at Army schools. This effort produced a series of tests intended to diagnose deficiencies in the P.C.s. Modified versions of these tests will be used in JSEP.

The JSEP program will include a front-end learning strategies module designed to improve soldier skills in reading, studying, test taking, and problem solving. The curriculum will consist of this strategies-training, plus 180 diagnostic review lessons, and 120 skill development lessons, which are being developed for the PLATO and MicroTICCIT computer systems. The program is being tried out at two TRADOC sites and two FORSCOM sites, prior to an Army-wide phased implementation.

SEMI-ANNUAL TECHNICAL REPORT

EXECUTIVE SUMMARY

Requirement:

The solicitation requires that a semi-annual technical report be submitted for Phase II to the Army Research Institute (ARI).

Procedure:

This report constitutes the official report of technical and developmental processes undertaken in the first six months of Phase II of the Job Skills Education Program (JSEP).

Findings:

Specific technical aspects are detailed for:

- o Project Management
- o Curriculum Design
- o Lesson Design and Programming
- o Data Management and Student Routing
- o Testing Procedures
- o Tryouts and Field Trials
- o Implications for Demonstration Year and Implementation

Use of Findings:

The processes reported here form the foundation for the Tasks for Phase II and Phase III.

SEMI-ANNUAL TECHNICAL REPORT

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SEMI-ANNUAL TECHNICAL REPORT

OVERVIEW

Operational Problem

It is not news that soldiers must be trained to do their jobs. They must be trained so that each Army job is performed competently--regardless of differences in ability and background in newly entering soldiers. To accept less would cause many mission elements to fail.

Moreover, many Army jobs are increasingly dependent upon the soldier's ability to use high technology and the ability to learn new technology as it develops. Soldiers, therefore, need more than training. They need enough education to be able to learn subsequent jobs, to become eligible for promotion, and ultimately, to provide leadership for tomorrow's Army.

The Job Skills Education Program (JSEP) is designed to provide soldiers with job-related basic skills instruction that is prerequisite to learning their skill level 1 and 2 job tasks during their first duty assignment. Based on an extensive job analysis of 94 of the Military Occupational Specialties (MOS) which contain the largest proportion of soldiers and tasks contained in the Soldier's Manual of Common Tasks, JSEP provides functional basic skills instruction on MOS specific requirements.

As it is conceptualized, the JSEP curriculum recognizes that the vast majority of soldiers will have been exposed to similar basic skills instruction before entering the Army. Many entering soldiers, however, will not have learned those basic skills well enough, or will not remember what they learned. To help soldiers learn better and remember more, JSEP incorporates straightforward training in research-based learning strategies that are directly aimed at improving learning and retention.

Research Objective

The goal of the US Army Job Skills Education Program (JSEP) is to design, develop, and test a job-related computer based curriculum for possible Army-wide adoption. The JSEP development project is concerned with four central elements:

1. The computer based curriculum,
2. The soldier management plan,
3. The soldier testing program, and
4. The supporting documents and reports.

The project is divided into three phases. Phase I undertook several tasks which included lesson design, planning documents, and reports that recommend specific courses of action. Many of the action plans spelled out in the Phase

I reports will be carried out in Phases II and III; some will be carried out in the years following Phase III.

Phase I contains the following tasks:

Task 1. Develop a conceptual definition for design requirements and specifications

Task 2. Review existing basic skills curricula.

Task 3. Review job task analysis and select Military Occupation Specialty (MOS) clustering schema.

Task 4. Develop JSEP implementation and management plan.

Task 5. Adapt or develop design specifications including instructional specification, engineering requirements, and human factors consideration.

Task 6. Develop evaluation standards.

Task 7. Develop JSEP evaluation plan.

Task 8. Develop cost benefit tradeoff analysis.

Task 9. Conduct predictive cost and training effectiveness analysis.

Task 10. Develop standards and a plan for the civilian academic community to award a high school diploma based on completion of JSEP.

Task 11. Phase I Report.

Phase II requires the development of 300 hours of lessons, the soldier management plan, and the preliminary tryout. Phase II includes the following tasks:

Task 12. Select hardware; where appropriate develop software; develop instructor training program and courseware for 300 hours of instruction.

Task 13. Conduct preliminary tryout.

Task 14. Phase II Report.

Phase III provides a continuation of the lesson development begun in Phase II and requires execution of the studies and evaluation plans developed in Phase I. Phase III includes the following tasks:

Task 15. Develop software and courseware for an additional 120 hours of instruction.

Task 16. Conduct JSEP tryout at two US Army Forces Command (FORSCOM) sites and two US Army Training and Doctrine Command (TRADOC) sites.

Task 17. Conduct evaluation and revision.

Task 18. Conduct cost/training effectiveness analysis.

Task 19. Develop technology transfer plan.

Task 20. Document total process in final report.

The JSEP Semi-annual Technical Report is a collection of narratives which cover the essential issues of Phase I and the first half of Phase II of the contract. These issues have been grouped in nine topic areas. The number of issues in each area varies. The topic areas are:

A. Project Management

B. Curriculum Design

C. Lesson Design and Programming

D. Data Management and Student Routing

E. Testing Procedures

F. Certification of High School Equivalency

G. Tryouts and Field Trials

H. Demonstration Year

I. Implementation

The narrative for each issue will describe the original plan, the current or implemented plan, and the reason for any discrepancies or changes.

A. PROJECT MANAGEMENT

Computer Applications

Tracking and coordination of a major project is essential to timely completion. Originally the critical path method and GANTT charting were proposed as the main management tracking technology. While these methods have proved useful, they have not proved sufficient. They do not provide the detailed information necessary to take corrective action.

Each prerequisite competency must be tracked through its individual design stages in order to get a comprehensive overview of the project. Also budget projections and budget status are a critical issue with a large staff.

A nationwide search was conducted for computer software that was designed for use in instructional development projects. Failure to find a suitable

package led us to design our own system based on some of the available business/management software. Our preliminary attempt was with an Apple computer and the Visi-series. We used the Visidex program to track the individual PC specifications produced in Phase I, but it was cumbersome. VisiCalc did not seem to have enough power to handle our budget tracking procedures. Our second, and more successful efforts were made with an IBM-PC and the Lotus 1-2-3 program. With the addition of 128K memory, Lotus and the IBM gave us the power to create two interacting spreadsheets which encumbered and projected salaries and expenses. Lotus was also used to design a PC tracking system. Lotus has a Macro programming function which allowed us to update the PC tracking system and to print out various versions of the data for monthly reports and weekly monitoring with a minimum of reformatting.

The data base functions of Lotus have allowed us to make sequential entries of purchase orders and charges for auxiliary functions and then sort the lists by charge designation, which greatly facilitates spreadsheet updates.

We recommend that other large ISD projects explore similar options.

B. CURRICULUM DESIGN

Priority for Long Lessons

Setting PC Lesson Development Priorities

Developing detailed instruction for all PCs would result in far more than the approximately 420 hours required under this contract. Whereas some PCs will require only about an hour to complete, some will take far more, such as 36f, Apply common rules of grammar, which will probably require many hours of instruction and practice. Short lessons will be developed for approximately 170 testable PCs. (See Table 7.) In an attempt to establish priorities for long lesson development, we recommended a method for selecting those PCs to be developed first.

We propose that the factors listed below be taken into account and lessons tentatively rated high, medium, or low priority (see Appendix A):

- How many MOS require the PC?
- What is the density of the MOS which require the PC?
- Are there common tasks which require the PC?
- Are other PCs dependent on the PC?
- Are there compatible job-related existing materials that can be integrated into JSEP for the PC?
- How did the TRADOC schools rate the PC?
- Is the PC related to the General Technical (GT) portion of the ASVAB?
- FORSCOM Priority rating.

o Is it appropriate for high school credentialing program?

Number of MOS. In order to answer the first question, the RCA MOS-PC Matrices for BSEP I and BSEP II were consolidated. The number of MOS were counted for each PC (see Table 8).

For example, for the 1 PC series except 1i, there were so many MOS for each PC that there was too little additional information to be gained looking at the rest of the questions. This PC was clearly needed. PC 1a through 1h were tentatively designated high priority. PC 1i has only 35 MOS and will be classified medium priority.

MOS density. Most MOS were medium density, but there are two with very high density, 11C with about 12,000 soldiers and 76Y with about 19,000. Therefore, 18a is a medium priority. For 18b and 18c, all of the MOS have relatively fewer soldiers, therefore 18b and 18c will have a lower priority.

Common tasks. PC series 1a - 1i (except 1g) all have common tasks. PC 1a through 1h are already high priority, so no reconsideration will be made. PC 1i, however, had previously been classified medium priority and would probably be reclassified high priority.

Dependent PCs. Some PCs are prerequisite to other PCs. If a PC is prerequisite to a high priority PC, it too, must become a high priority. PC 1c, 1d, and 1e are prerequisite to 1f. If 1f is a high priority, all three, 1c, 1d, and 1e, should become high priority.

TRADOC priority. TRADOC surveyed the proponent service schools to obtain priorities for all JSEP MOS. The schools rated each PC for each MOS as:

A PC already taught in Advanced Individual Training (AIT)
1 Unanimous agreement priority one PC
2 Mixed responses mostly positive
3 Mixed responses mostly negative

The schools further rated each PC as to whether it was difficult for soldiers who lacked the competency to learn their jobs. An A, 1, or high difficulty rating increases the FSU priority rating.

GT relationship. If a PC is GT related it automatically becomes high priority. A PC is GT related if the PC matches the skills tested on the GT.

Existing materials. A PC could be reduced in FSU development priority if JSEP compatible existing materials were available. If McFann-Gray's (MGA) lesson "Introduction to Numbers" matched the indicator statements for PC 1a then PC 1a would be taught using the McFann-Gray lesson. The MGA materials are primarily drill and practice. They may be programmed on one or both of the computer systems used to deliver JSEP.

Level of difficulty. RCA recommended developing instruction at two difficulty levels. Since there is not yet any data on what would be difficult for the target audience, FSU recommends a short lesson on each PC of the approximately 170 PCs that Educational Testing Service (ETS) declared testable. Long lessons should then be developed for higher priority testable PCs.

Raising general technical aptitude area (GT) scores. One goal of BSEP, BSEP II, and the JSEP programs since Task I of Phase I is to increase the chances that soldiers taking the instruction could prepare themselves to be eligible for reenlistment. When soldiers are eligible for reenlistment, based on their test scores, the Army can choose from a much larger population those to recommend for reenlistment based on their job performance and service records.

Identifying soldiers who need to raise GT scores should be a part of the JSEP management system. JSEP soldiers with GT scores within the range of eligibility can go through the PCs that match the skills tested on the GT (arithmetic reasoning, paragraph comprehension, and word knowledge).

The proposed long lesson priority is based on numbers of soldiers requiring the lesson, the RCA analysis of ETS Test results, the TRADOC study of difficulty and priority, and the GT relatedness of the lesson.

- The number of soldiers criteria gave heavy weight to the lessons on common task related PCs. High density MOS such as 11B or lessons required by more than 40 MOS added weight to non-common task PCs.
- RCAs analysis was used to identify those lessons on which more than 50% of soldiers failed the ETS Test.
- The TRADOC study collected opinion data from instructors and for each PC on job difficulty, for each MOS JSEP priority, and whether the PC was already covered in the school.
- Lessons related to GT improvement also received a higher priority.

FSU recommends a decision based on a weighting of those four criteria with the following factors in order of importance.

1. Common task PCs
2. ETS Test data
3. GT improvement
4. High number of soldiers impacted

Use of the RCA PC - MOS Matrix. The RCA PC-MOS matrix was divided into 2 parts: BSEP I and BSEP II. We consolidated the data and came up with a JSEP PC-MOS matrix. We planned to use the matrix to help decide lesson development priorities.

The matrix provides an excellent quick look at PC series to see how many MOS require it. Although there are some bugs in the data tape, the information has been very useful. We recommend a similar analysis for future curriculum development efforts. A summary of the priorities is shown in Appendix A.

C. LESSON DESIGN AND PROGRAMMING

Lesson Design

One of the initial lesson design problems faced by the JSEP staff was deciding upon the sequence in which lessons would be developed in the JSEP curriculum. Our responsibility is to produce 420 hours of instruction, but what would be the priority order in which lessons would be developed for the RCA prerequisite competencies?

Various proposals for setting priorities were discussed and data from various sources were reviewed. During the discussion of the various methods, the observation was made that, for any particular PC, there are two broad categories of soldiers who, at first, would appear to require instruction on the PC. The first category is composed of those soldiers who could not correctly answer the test items for the PC, but with only a slight review would recall prior learning and be able to perform quite well. A second broad category of soldiers includes those who had never learned the skill and probably lacked one or more important subordinate skills.

From this set of observations, the concept of short and long lessons evolved. In general, the purpose was to first design very brief lessons (the short lessons) which would quickly bring up to speed those soldiers who had previously learned but forgotten the skills. Such lessons would take very little time of those who had never learned the skill. The second set of lessons (the long lessons) were to serve those soldiers who required in-depth instruction in order to produce their first successful performance of the skill.

The lessons are designed as follows:

a. Short lessons. Almost all of the PC's can be considered to be (in Gagne's terminology) intellectual skills. For the short lessons, the skill is described, and an example of the application of the skill is demonstrated. Then the learner is provided a series of representative practice and feedback items. The feedback for incorrect responses is sufficiently detailed to clarify misconceptions and bring student performance for those who had previously mastered the skill, to an acceptable level. The short lessons include direct instruction on only the skill described in the PC, and not on any of the subordinate skills associated with the PC.

b. Long lessons. The long lessons are intended for soldiers who didn't pass the test for the short lesson on the PC and who probably lack one or more of the relevant subordinate skills. A long lesson includes both a number of subordinate skills and a fuller elaboration of the events of instruction for each skill.

To develop a long lesson, the designer first does a hierarchical analysis to identify potential subordinate skills. Then, for each skill which is a potential problem for the soldier, a complete set of instruction is provided which includes motivational pre-instructional activities, a complete description of the skill and an appropriate range of examples. An ample number of practice and feedback problems are provided, along with alternate remedial instruction where applicable. The

student should master each successive subordinate skill before returning to instruction on the PC itself. The intent is to provide sufficiently extensive instruction, including appropriate practice and feedback, that all soldiers will be able to perform the skill.

The testing strategies which will be used to route soldiers into and out of the short and long lessons are still evolving. The basic principle is that the soldier who mostly "knows" the skill but is diagnosed into the instruction will exit rapidly after completing the short lesson, while the soldier who really requires the instruction will receive it, in depth, in the long lessons.

Learner Strategies

During Phase I we conducted an extensive review of the literature on various learner strategies that seemed to be well-established and would have a potential value in the JSEP curriculum. Based on this review and advice from our consultants, Barbara McCombs, Donald Dansereau, and Richard Mayer, we planned a six-module learner strategies package.

The rationale for our approach to strategy training is outlined in a paper by Derry entitled Strategy Training: An Incidental Learning Model for CAI that was presented in April 1984 at the annual meeting of the American Educational Research Association. We are teaching five types of learner strategies in JSEP: (1) mood management techniques, (2) self-pacing methods, (3) comprehension strategies, (4) memory strategies, and (5) problem-solving techniques. Also, we plan to extend the problem-solving techniques to a special unit in test-taking skills.

Hardware Choices

There were many hardware options initially discussed and considered for JSEP. Ultimately, the hardware options decided on were those which would provide the most necessary capabilities across the largest number of lessons. Hardware options adopted for MicroTICCIT include the standard MicroTICCIT workstation, which includes light pen, detached keyboard, and screen printer. Hardware options adopted for PLATO include the current VIKING terminals with touch panel and detached keyboard, screen printer, and graphics tablet.

Hardware options which were considered but not adopted include videotape, speech generation, sound generation, use of slides/film, realtime actual equipment interface, graphic input, and use of optical character/mark sense readers.

Some hardware options might still be desirable for inclusion in JSEP at a later date. For example, we would like to include some sounds in JSEP lessons for reinforcement and motivation. It would be desirable to include interesting sounds in the form of beeps, buzzes, and sound effects (e.g. airplanes crashing, truck starting, bomb exploding, etc.). At the present time these capabilities are not practical for either the PLATO or MicroTICCIT systems.

Standard on Production of Lessons on MicroTICCIT

During most of Phase II production, we have used the TICCIT Authoring Language (TAL). We made the decision to use TAL because it gave us the following capabilities.

1. Freedom to write Interactive Rules.

2. Direct conversion to ADAPT. When ADAPT is released we will convert all existing TAL programs and complete all production in the new language.

3. Flexibility in lesson content and structure.

The alternative to TAL, the Authoring Procedure for TICCIT (APT), is a highly structured authoring environment which presently prevents interactive, rules, direct conversion with ADAPT programming code, and multiple lesson formats.

ADAPT is designed to be The language for MicroTICCIT, and will be released shortly. We will use ADAPT because it combines the efficiency in production of APT, derived from its templated-formats, with the power and flexibility of TAL. ADAPT also has new features that run on MicroTICCIT such as color palette, and video.

Because our current production system does not have any MicroTICCIT terminals we have not used ADAPT's new features. However, shortly after we obtain ADAPT, we will obtain several MicroTICCIT terminals, so our production system will match the delivery system in all important respects.

D. DATA MANAGEMENT AND STUDENT ROUTING

Comments About the JSEP Data Management System (DMS)

As of this writing, the DMS exists as an emergent set of assumptions and interrelated design decisions. During the past year, our plans for the DMS have had to be modified to accommodate the additional goal of GT improvement. We have also recently re-examined our selection and routing criteria because of the poor match between the RCA Locator and Diagnostic tests and our PC objectives. No final decisions have been made regarding the new criteria.

The DMS will be the "control center" for JSEP and will collect demographic data and lessons performance data and will use those data to provide routing options to soldiers. The system will be flexible enough to account for the needs of different sizes of Army bases. At large bases, the site managers and instructor will be allowed control over the DMS at specific input/output points. At small bases, the DMS will be able to function without any instructor involvement.

Regardless of the special conditions at each site, we recommend that the DMS operate roughly as follows:

1. The DMS will collect demographic data about soldiers. This will include scores on the GT.

2. The system will perform a front-end analysis to determine each soldiers' recommended program of study. All data to be used in this analysis has not yet been identified.

3. Soldiers will obtain a copy of their program of study and discuss it with their instructor.

4. They will then proceed through their program of study, controlling their own pace and sequence of lessons. The instructor will be involved as necessary. Soldiers will report all completions to the instructor to update an off-line record of their progress.

5. As soldiers proceed through their program of study, the DMS will collect and make available to instructors performance data ranging from test scores to time in each lesson.

Potential Routing Mechanisms

Four independent measures were explored as potential screening mechanisms to help soldiers identify lessons in which they have a high likelihood of requiring instruction. (See correlation matrix on Table 1.) These were the:

(1) JSEP Achievement Test used as a pretest,
(2) GT scores,
(3) RCA Locator Verbal, and
(4) RCA Locator Math.

These measures were correlated with pretest scores of the seventeen lessons used in the tryout. It was hoped that one of these measures would demonstrate consistent positive significant correlations across a majority of the lessons. If this had been the case, then scores on the screening measure could predict whether a soldier would likely require instruction in the lessons. The results of the correlational analyses are presented in Table 2.

Table 1

Intercorrelations Among Predictor Variables and Performance Measures

	1	2	3	4	5	6	7	8
1. Locator Verbal	---	.06	-.32*	.04	.03	-.03	-.10	-.03
2. Locator Math		---	.02	.08	-.33*	.02	.03	-.04
3. GT			---	-.08	.03	.43*	.37*	.28*
4. JSEP Achievement Pretest				---	-.11	-.33*	-.23	-.05
5. JSEP Achievement Posttest					---	.17	.17	.06
6. RCA Pretest						---	.78*	.37*
7. RCA Performance Posttest							---	.16
8. CLOZE								---

* $p < .05$

Table 2

Correlations of Potential Predictors of Lessons Pretest Scores

Lesson Pretests	JSEP Achievement Pretest	GT	Locator Verbal	Locator Math
1. 30b Flowchart (n = 39)	.01	.24	.19	.40*
2. 32a Blocks in a Form (n = 39)	-.13	.39*	-.25	-.14
3. 32b Forms (n = 37)	-.16	-.02	.56*	.19
4. 32c Forms (n = 17)	.00	-.41*	-.23	-.39
5. 32d Forms (n = 28)	-.02	.22	-.24	-.14
6. 32e Forms (n = 29)	.00	-.03	-.14	.35*
7. 34a Major and Subordinate Clauses (n = 39)	.10	.19	.03	.04
8. 36c Capitalization (n = 29)	-.12	.31	.04	-.15
9. 40a Hazards (n = 37)	-.38*	.12	.10	.18
10. 40b Preventive Measures (n = 39)	-.25	-.03	-.12	-.20
11. 40c Emergencies (n = 39)	-.27*	-.04	.05	.04
12. 01g Rounding Numbers (n = 39)	-.19	.35*	.10	-.05
13. 5f Gages (n = 17)	-.03	-.01	.36	-.13
14. 26b Technical Vocabulary (n = 39)	-.08	.21	-.23	-.12
15. 28a Tables and Charts (n = 15)	.36*	.01	.16	-.55*

Table 2 Continued

Lesson Pretests	JSEP Achievement Pretest	GT	Locator Verbal	Locator Math
16. 28b Tables and Charts (n = 18)	-.05	.33	.14	-.32
17. 28c Tables and Charts (n = 17)	-.25	.15	.02	.08
Mean Correlation across all lessons	-.08	.08	.02	-.05

* $p < .05$

The results of the correlational analysis indicate the mean correlation between the potential routing measures and the lessons were: JSEP Achievement Pretest, M = -.08; GT, M = .08; Locator Verbal, M = .02 and Locator Math, M = -.05. The correlations between predictor measures and lesson pretest measures virtually clustered around zero. We concluded that no single score from any of these measures is likely to consistently predict performance across lesson pretests. The potential use of any of these as screening devices appears remote.

This lack of relationship between general measures and the more specific lesson pretests could be attributed to several sources:

1. The unreliability of the 10-15 item lesson tests could attenuate the correlations to levels below significance in most lessons.

2. Since the distributions of scores of the pretests for many of the lessons were so highly skewed toward the positive side, correlations were consequently suppressed due to non-linear relationships between variables.

3. Truncated ranges in the general ability measures would reduce the potential for correlation with lesson pretests. GT scores 80-99 represent the 3rd quantile in the distribution of measures of general intelligence.

4. One would not expect the JSEP test, comprised of 3 items randomly selected from 11 discrete knowledge units, to predict mastery of a single knowledge unit. There is only 1/11 of the achievement test domain in common with any single pretest.

The implications of these findings regarding the use of a single routing mechanism may include the following:

a. Administer these general prediction measures in the Full Scale tryout to validate the above results on a wider array of lessons, but do not use them as either screening or routing mechanisms in the tryout.

b. Conduct an item analysis on the lesson posttests using another sample of soldiers to possibly improve the tests items and hence their reliabilities.

c. Explore the possibility of clustering lessons on the basis of underlying cognitive ability factors and then using the general measures to predict to these ability factors. These factors could be identified possibly through factor analytic procedures or other computer sorting methodologies. Again, recommendations pertaining to the use of such procedures in the implementation phase would be made from additional data gathered from the Full Scale Tryout.

E. TESTING PROCEDURES

General Performance Measures

Several general performance measures were administered in the Fort Rucker Tryout to assess the transfer of specific objectives learned in the lessons to more general cognitive abilities:

1. JSEP Achievement Test
2. RCA Performance Test
3. CLOZE Test
4. GT (ASVAB General Technical)

The JSEP Achievement Test and the RCA Performance Test were administered in a pre - post format. The CLOZE Test was administered in only a posttest format and the GT scores were simply acquired from soldier records. Data pertaining to the instruments are presented in Table 3.

Table 3

General Performance Measures

Measure	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Effect size
1. JSEP Achievement Test (39 possible)	28.6	3.4	33.3	2.6	1.38
2. RCA Performance Test (79 possible)	48.7	11.8	49.1	13.5	.03
3. CLOZE (35 possible)	----	----	14.8	6.0	----
4. GT	91.2	4.9	----	----	----

The JSEP Achievement Test

The JSEP Achievement Test was developed by selecting at random three items or tasks from the posttests of 11 lessons. Further development of the test would render the instrument a sensitive, reliable, and valid proximal measure of JSEP achievement.

RCA Performance Test

The items selected for the performance test were drawn from the RCA Criterion Test. These items were generally consistent with the content of the JSEP lessons but not always exactly so. In many instances the complexity of the stimuli was greater in the Performance Test than in the items of the lesson posttests. For example, the number of process/decision steps in the lesson on flowcharting was 3-5 (as many as could be presented on a display screen) whereas the Performance Test contained 15-20 such steps. Items with electronic circuitry and rounding numbers tasks were also more complex than material presented in the computer-based lessons. Thus, there was an increment not only in difficulty from the nature of the assessment task (recognition to recall) but also in terms of the complexity of the stimulus function.

Therefore, in order to construct a more sensitive and valid recall measure, we should begin from our own JSEP Achievement Test as a point of departure. From the pool of JSEP Achievement Test items we could perform the following:

1. Select one JSEP Test item from each lesson comprising the set of GT prep lessons and the set of MOS common task lessons. Two Performance Tests would then be created, one for MOS Common Tasks and one for the GT preparatory course.

2. The selection would be based on such considerations as resemblance of the stimulus context to on-the-job situations and the ease and objectivity of scoring the response.

CLOZE Test

The CLOZE procedure was used as a test because it is intended to measure reading comprehension and in this case to assess the ability to read the soldier's field manual. The CLOZE Test used in the preliminary tryout was created by selecting a 300-word paragraph with accompanying diagrams from the Manual of Common Tasks. Every eighth word was omitted from the paragraph. In all, thirty-five words were omitted from the paragraph. The content of the passage concerned procedures for the proper aiming of a rifle.

The results of the trial test of the CLOZE procedure indicated that the group of soldiers attained a mean of 14.8 with a standard deviation of 6.0. The scores were normally distributed about the mean. Only one soldier was unable to begin the task.

While the CLOZE procedure is designed to measure a general ability to comprehend written prose, it is questionable whether it could or would be an appropriate outcome measure for the JSEP curriculum. The JSEP curriculum is structured in terms of many narrowly defined skill and content units that can be learned in 20 minutes to 1 hour. The question is raised as to whether learning from specific learning units will be integrated and transfer to more general abilities, such as comprehending a paragraph of prose in a field manual.

Secondly, the nature of the passage that was selected was very different from most of the written material typically found in the FM's. The more familiar prose in the manual is in the form of stepwise lists of procedures, diagrams, and flowcharts to conduct a given task.

For these reasons, it is probably unwise to use the CLOZE procedure as a JSEP outcome measure to assess the ability to comprehend FMs.

The GT

One of the purposes of JSEP is to assist soldiers in achieving a better performance on the GT (General Technical Subtest of the ASVAB). Soldiers were selected for the Tryout on the basis of their GT scores--that is, they earned GT scores between 80 and 99. Thus the GT score distribution of M = 91.2, SD = 4.9 differed from the Army wide distribution M = 100, SD = 20.0. Given the GT score distribution of the expected JSEP population, in subsequent field trials we will likely observe effects of JSEP instruction not only in terms of changes in the mean, but also in terms of changes in the distribution of scores about the mean.

Use of Job Performance Measures to Test Effect of JSEP

Use of job performance measures was originally proposed for JSEP evaluation; however, there are certain technical difficulties.

JSEP could be evaluated in a longitudinal study provided that there were enough implementation sites to have sufficient soldiers to study. A longitudinal study of this magnitude could be implemented by Education Division, ODCSPER, TRADOC, or FORSCOM. It would take three to four years. SQT's and other measures, as yet not fully identified, could be used as the criterion variable for correlations.

G. TRYOUTS AND FIELD TRIALS

The JSEP Field Trials were conducted at Fort Rucker, 5-18 May 1984.

The Population

By directive, we requested that soldiers be included in the tryout population who met two conditions:

(1) they had earned GT (ASVAB General-Technical) scores between 80 and 99, and

(2) for the most part they had been recently stationed at Fort Rucker.

The MOS represented in the tryout were 67 (N, V, Y), 76 (N, W, Y), 91B, and 94B. Background data in terms of age, rank, sex race, time in the Army and time on the post are presented in Table 4 below. Generally speaking, the 42 soldiers participating in the tryout had been in the Army less than 15 months, at Fort Rucker less than 8 1/2 months and in their respective MOS 8 months. Sixty-seven percent (67%) had ranks E3 or below. In order to achieve the required number of participants for the tryout, the length of time soldiers had been at Fort Rucker had to be extended beyond the desired 3 month limit. One soldier was a master sergeant who had been in the Army more than 9 years. Nevertheless, the GT parameters were not extended in either direction.

Over half (55%) of the population indicated they will seek reenlistment. If this is the case, they will most likely require some assistance to raise their GT scores in order to qualify for reenlistment. Thirty-eight percent (38%) indicated they were not sure whether they wanted to reenlist. Perhaps some of the doubt in this group could be attributed to lack of confidence in their ability to meet desired minimum standards on the GT. Some had already undertaken study to improve basic skills: 24% had taken a BSEP reading course, 10% a grammar course, and 29% a mathematics course. Ninety-three percent had attained a high school diploma.

On the basis of background characteristics, Army career goals and educational experiences, it is highly likely that most in the Fort Rucker sample represent soldiers Army wide who would be interested in taking JSEP lessons to improve basic skills, particularly for reenlistment. Therefore, we conclude that most of the soldiers in the Fort Rucker tryout were representative of potential JSEP populations.

Table 4

Sample Background Characteristics of Fort Rucker Tryout (n=42)

Dimension	Frequency	Dimension	Frequency
Age	mean = 22.4 median = 20.7 SD = 4.4 range = 40-18	Time in present job (months)	mean = 14.5 median = 8.0 SD = 18.8 range = 2-84
Rank	E1 (1) E2 (14) E3 (13) E4 (9) E5+ (5)	Time on post (months)	mean = 11.7 median = 8.5 SD = 11.2 range = 1-42mo
Sex	male 34 female 8	High school diploma	yes = 39(92.9%) no = 3(7.1%)
Race	white 19 black 17 hispanic 6	Highest grade completed	9th 1 10th 1 11th 1 12th 38 13th 1
MOS	67N, V, Y (11) 76N, W, Y (16) 91B (8) 94B (7)	Seek reenlistment?	yes = 23(55%) don't know = 16(38%) no = 3(7%)
Time in Army (months)	mean = 25.7 median = 15.5 SD = 25.2 range = 5-99+	Any postsecondary education?	yes = 4 no = 38
Taken a BSEP reading course?	yes = 10(24%) no = 32	Had a previous computer course	yes = 7 no = 35
Taken a BSEP grammar course?	yes = 4(10%) no = 38	Had a previous Audio-visually oriented course	yes = 11 no =31
Taken a BSEP mathematics	yes = 12(29%) no = 30		
Taken an ESL course	yes = 3(70%) no = 39		

Effectiveness of Lessons

The Fort Rucker tryout provided an opportunity to examine the quality of lessons on an actual client population. Until the preliminary tryout, the lessons had undergone only internal reviews and some one-on-one testing. Because we were unable to conduct extensive formative development of the lessons, important questions pervaded early development such as: Are the lessons too difficult or too easy? Will they sustain sufficient interest and attention? Are the screen displays attractive? How much can soldiers learn in a short 20 minute recall lesson? How much can soldiers learn in a longer one-hour lesson? The tryout offered an initial examination of such issues.

The difference between soldiers' pretest and posttest scores on the 17 lessons are presented in Table 5. Across all lessons there was an average median gain score of 8.0%. There were two lessons in which there was a 20% gain or higher, five in which there was a 10% gain or higher, five in which there was a 5% gain or less. The long lessons (1 hour of CAI) produced an average of 14.1% gain while the short lessons (15 minutes including the test) produced a 6.1% average median gain.

Table 5

Cumulative Percent of Soldiers Scoring at Percent Level or Higher on Pretest and Posttest

Lesson		50	60	70	80	90	Median % Correct	Median % Gain
Long lessons								
1. 01g Rounding Numbers (n=40)	Pretest	74	49	31	26	8	60.3	+9.7
	Posttest	80	62	52	35	25	71.0	
2. 5f Gages (n=12)	Pretest	100	100	88	65	47	83.3	+11.7
	Posttest	100	100	92	83	75	95.0	
3. 26b Technical Vocabulary (n=37)	Pretest	46	22	8	5	3	47.8	+31.5
	Posttest	95	81	65	49	30	79.3	
4. 36c Capitalization (n=23)	Pretest	79	72	59	31	3	71.3	+ 3.6
	Posttest	83	70	61	30	9	74.9	
Short lessons								
5. 28a Tables and Charts (n=12)	Pretest	87	80	80	73	47	88.7	+ 9.3
	Posttest	92	92	92	75	67	97.0	
6. 28b Tables and Charts (n=17)	Pretest	78	72	61	56	22	82.7	- 1.2
	Posttest	88	88	71	65	18	81.5	

Table 5 Continued

7.	28c Tables and Charts (n=14)	Pretest Posttest	94 86	65 86	47 79	18 57	18 21	67.0 86.0	+19.0
8.	30b Flow Chart (n=40)	Pretest Posttest	94 90	79 87	64 82	46 67	5 32	78.4 87.4	+ 9.0
9.	32a Locate Blocks in a Form (n=39)	Pretest Posttest	100 100	100 100	95 100	92 100	90 95	99.8 99.9	+ 0.1
10.	32b Forms B (n=31)	Pretest Posttest	100 100	100 100	97 100	89 100	84 93	97.6 98.8	+ 1.2
11.	32c Forms C (n=13)	Pretest Posttest	88 92	88 85	88 77	82 77	76 77	97.8 97.9	- 0.9
12.	32d Forms D (n=28)	Pretest Posttest	86 100	79 96	71 82	54 71	11 32	75.8 80.5	+ 4.7
13.	32e Forms E (n=29)	Pretest Posttest	100 100	93 100	90 86	69 59	52 41	88.8 83.0	- 5.8
14.	34a Major and Subordinate Clauses (n=39)	Pretest Posttest	72 82	51 74	28 69	20 46	8 38	55.6 73.3	+17.7
15.	40a Hazards (n=30)	Pretest Posttest	100 100	100 100	100 100	100 100	92 93	99.5 99.7	+ 0.2
16.	40b Preventive Measures (n=39)	Pretest Posttest	100 100	100 100	100 95	85 90	64 72	89.6 91.6	+ 2.0
17.	40c Emergencies (n=37)	Pretest Posttest	56 95	51 92	28 73	15 65	0 32	55.6 79.6	+24.0

The conclusions pertaining to the lesson performances are that the long lessons appear to help individuals increase mastery of lesson objectives but that the effect of short lessons as "refreshers" varied considerably across lessons. The largest gains were in lessons that had low pretest scores and dealt with concrete verbal or figurative learning (e.g., Technical Vocabulary, Major and Subordinate Clauses, Emergencies). The more abstract the concepts or the more a lesson stressed the application of rules, the less was the gain (Capitalization and Rounding). Over half of the lessons (nine of seventeen) had median pretest scores exceeding 80% correct. Thus, there was a pronounced

ceiling effect on the amount of potential gain the lessons could demonstrate. Finally, while the recognition mastery of the lessons was demonstrated and sustained over several days, the amount of recall mastery was negligible. The validity of the recall test however may be suspect, because the test items were more intricate and complex than the test items in the lesson tests.

The third aspect of the evaluation concerned the attitudes soldiers had toward the quality of the lesson, and the conditions under which JSEP would best be administered. The responses of soldiers are presented in Table 6.

Table 6

Attitudes Toward JSEP

Item	M	SD
1 = strongly agree 2 = agree 3 = uncertain 4 = disagree 5 = strongly disagree		
Conditions for Learning		
1. It was easy for me to learn to use the computer.	1.64	.76
2. Using the computer for four hours at a time was too long.	3.71	1.03
3. I think written assignments should be used along with the computer.	3.80	1.04
Soldier Impact		
4. I think the lessons will help me to read and understand the publications I use.	1.98	.72
5. The skills I've learned in JSEP will help me to advance to a higher grade/rank in the Army.	2.76	.85
Army Related Concerns		
6. I think the instructor in the Education Center should teach the lessons instead of the computer.	4.29	.60
7. I would be willing to take more JSEP lessons on a computer if they were offered during on-duty hours.	1.76	.69
8. I would be willing to take more JSEP lessons offered on a computer if they were offered during off-duty hours.	3.14	1.24

Table 6, Continued

9. I think my unit commander would be willing to release me from duty to take JSEP lessons.	2.31	.87
10. I think JSEP should be included as an educational program offered by the Education Center.	1.62	.66

We conclude that the soldiers enjoyed the lessons and felt they learned from them. However, the majority of soldiers indicated they would not elect to take the lessons off-duty. However, there was considerable variability among participants. The soldiers strongly preferred CBI to regular instructor delivered lessons.

Student Response to Screen Formats

The purpose of the JSEP General Questionnaire was to assess soldier attitudes about the JSEP program as a whole and how JSEP might suit their own and the Army's goals. The subjects were 42 soldiers participating in the Fort Rucker preliminary tryout with GT scores between 80 and 99. They were exposed to a one-week, four hours per day simulation of the JSEP program. The instrument was administered on the last day of their assigned duty time and the soldiers were informed that they were not required to record their names on the survey.

Results

Question 1.

It was easy for me to learn to use the computer.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
45%	50%	2%	0%	2%

Comment: The brief orientation procedures used to orient individuals to the computer appeared to be fully adequate for 95% of the subjects. Appropriate sign-on procedures were demonstrated by the proctors, and the existing self-instructional computer programs on MicroTICCIT and PLATO directed them from there. Minimal individual coaching and encouragement was given by the proctors.

Question 2.

Using the computer for four hours at a time was too long.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
0%	20%	12%	46%	22%

Comment: Sixty-eight percent of the soldiers disagreed with the statement and only 19% indicated four hours is too long. Thus, four hours was not considered to be too long a time in which to receive computer-based instruction.

Question 3.

I think the instructor in the educational center should teach the lessons instead of the computer.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
0%	0%	7%	57%	36%

Comment: 93% of the soldiers disagreed with this statement.

Question 4. (Bogus Question).

Question 5.

I think computer lessons should be used only to practice what we learn from an instructor.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
0%	17%	14%	45%	24%

Comment: This was a question to help determine how a computer should be used in an instructional context. More specifically, whether it should be restricted to use as an adjunct to conventional instruction. Most soldiers (69%) disagreed that it should be used exclusively as a complementary drill and practice medium.

Question 6.

I think written assignments should be used along with the computer.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
10%	38%	14%	33%	5%

Comment: A question was raised by one of the trial observers that some soldiers said they would like print materials to go along with the lessons. Forty-eight percent of the JSEP subjects agreed with the statement while 38% disagreed. Thus there is considerable ambivalence regarding the utility of such material. Another way of looking at the issue is that only 15% felt strongly one way or the other.

Question 7.

The lesson about mood management helped me control my mood during JSEP lessons.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
2%	36%	31%	21%	10%

Comment: The soldiers appeared to be mainly uncertain or not strongly influenced by the mood management experience. The extent of ambivalence or uncertainty might have been due to several factors: (1) the fact that the lessons were administered in paper format, a medium soldiers did not seem to prefer; (2) the lack of perceived relationship between the mood management lesson and subsequent JSEP lessons; and (3) the absence, on the part of a segment of soldiers, of a perceived need for such instruction.

Question 8.

I think I will use what I learned about mood management in other situations.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
12%	62%	17%	10%	0%

Comment: Seventy four percent of the soldiers agreed that the lesson on mood management will help them in facets of their lives, outside of the realm of instruction (see question 7). Thus the mood management lesson was perceived to have more of a general value than in the mastering of lessons. The question is raised, Is this the principal intent of the mood management lessons?

Question 9.

The lessons will help me in my MOS.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
7%	43%	21%	24%	5%

Comment: It must be remembered that soldiers were not assigned to the lessons based on either their need for skill remediation or because these lessons were required for their MOS. For example, how much would cooks or pumpers and gagers perceive a need for flowcharting, capitalization, or hazard prevention. Additionally, based on pretest scores of lessons, most soldiers were already at mastery level for most of the lessons.

Question 10.

Overall, the JSEP program was well managed.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
39%	57%	5%	0%	2%

Comment: Ninety-three of the soldiers agreed the simulation was well managed.

Question 11.

I would be willing to take JSEP lessons offered on a computer if they were offered during on-duty hours.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
38%	48%	14%	0%	0%

Comment: Eighty-six percent (86%) agreed they would be willing to take JSEP courses on-duty. Thus soldiers appear to be very favorably disposed toward receiving the kind of instruction encountered in the simulation. Significantly, no one disagreed with the statement.

Question 12.

I would be willing to take more JSEP lessons offered on a computer if they were offered during off-duty hours.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
7%	29%	26%	19%	19%

Comment: The responses indicate that soldiers are less favorably disposed to taking JSEP on their own time. Nevertheless, only 38% disagreed with the statement. This outcome must be interpreted taking into consideration that many of the soldiers saw no need for the instruction since they had already mastered most of the material. Perhaps more would be favorably disposed to taking JSEP on their own time if they perceived a pressing need for it, e.g., raising a GT score to qualify for reelistment in the Army.

Question 13.

I think my unit commander would be willing to release me from duty to take JSEP lessons.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
17%	43%	36%	2%	2%

Comment: Sixty percent agreed with the statement and only 4% disagreed. Consequently, most of these soldiers perceived there would be command support for such a program and that the program will be worthwhile for the Army. This item was also designed to allow soldiers to "project" on to their commanders their real feelings about the worth of the experience. Thus, this item may be one of the more critical appraisals of the JSEP experience.

Question 14.

I think JSEP lessons will help me read and understand the publications I use.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
24%	57%	17%	2	0

Comment: Eighty-one percent of the soldiers felt the lessons would help them to better understand written materials encountered in the Army.

Question 15.

The skills I've learned in JSEP will help me advance to a higher grade/rank in the Army.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
10%	12%	52%	17%	0%

Comments: Few (22%) soldiers saw the potential for JSEP to help them gain promotions. The reason for this may be similar to the possible explanation of question 12 results.

Question 16.

I think JSEP should be included as an educational program offered by the Education Center.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
48%	43%	10%	0%	0%

Comment: Again JSEP received a strong endorsement from the soldiers regarding its potential inclusion in the Army's Educational offerings. Ninety-one percent agreed with the statement.

Summary Conclusions

1. Soldiers had little difficulty learning to use the computer.
2. Four hours is not too long for a learning session on the computer.
3. Soldiers did not prefer instructor-taught lessons to the computer based lessons.
4. The relationship between mood management lessons and helping to learn lesson material was not apparent to the soldiers, but they did perceive the relevance of mood management to other facets of their lives.
5. The soldiers saw the major utility of the lessons in helping them to read and understand published material. However, they perceived less utility for MOS job performance and even less for helping them acquire skills to gain promotions.
6. The soldiers very much enjoyed their experience during the trial and would like to see JSEP become part of the Education Center's offerings.

H. DEMONSTRATION YEAR

The demonstration year is Phase II of the JSEP Implementation effort. In March of 1984, representatives from Education Division, ODCSPER, ARI, and FSU met to replan and reschedule JSEP implementation. At the beginning of the development contract, September 1982, it was envisioned that Army-wide implementation would immediately follow curriculum development. During 1984 it became apparent that the cyclical nature of contracting for learning center staff, and the U.S. Army budget and procurement processes would provide a one or two year gap between curriculum development and stage one of the phased Army- wide implementation. This provides an excellent opportunity to schedule activities which will contribute to the eventual success of that implementation. Three phases of activity were planned. The first phase will be dissemination of the objectives and test questions for the curriculum. Phase II will be a year-long demonstration at four sites. The final phase, Phase III, will be technical consulting to the actual implementation sites. All three phases are concerned with transmitting information.

The demonstration year will provide an opportunity for Army personnel to see a successful program in a relevant long-term setting. It will also provide a setting for advanced training of personnel.

While this effort is not directly the concern of FSU under the present JSEP contract, its existence has affected some of the decisions concerning this contract, and FSU personnel are able to offer recommendations. One major recommendation was that the demonstration sites be the same as the field trial sites. This particular decision would save the U.S. Army the expense of moving the equipment twice in a short period of time.

I. IMPLEMENTATION

It is intended that JSEP have a management system that could assign other ACES components. This assignment might be to McFann-Gray materials, reading, English as a second language, etc. The umbrella concept was the notion that all programs be related.

Statement of Work for JSEP Coordinator

The job duties of the JSEP coordinator in learning center staff have been defined in a statement of work. CBI instruction requires different facilitation skills than one-to-one or small group tutoring. It was recognized that the contracting cycle of the individual learning centers required advanced information about the types of skills required of future staff.

With the time frames and the nature of CBI in mind, FSU staff and persons familiar with staffing at the CBI facilities were asked to contribute lists of job duties. These lists were then distilled by eliminating duplicates.

The SOW includes all the job duties connected with JSEP; it does not necessarily represent the duties of one person only. The staffing pattern and numbers of staff will be dependent on the number of students per class, and the skills available in the job market.

We have carried out an extension of this activity. One of our staff members has contacted the PLATO lab staff of the Army sites, interviewing them about the conditions of their jobs. From these interviews we have developed guidelines for instructional materials for staff.

Exhibit - Statement of Work

Present staff may or may not fit into the staffing profile for JSEP.

STATEMENT OF WORK FOR JSEP COORDINATOR

Background

1. Work experience in training or education with adults.

2. Work experience in or basic knowledge of CBI or CAI instruction.

4. Good oral communication skills.

Pre-JSEP Training

1. Successful completion of training in: JSEP concepts and formats, learner strategies, terminal operations, PLATO/TICCIT management.

2. Participate in periodic conferences/workshops.

Computer Operation

1. Operate computer terminals; use terminals to enter required data; make necessary printouts; enter student data/information; create and update permanent student record file; register students.

2. Demonstrate system to interested visitors.

3. Work as trainer for new or replacement instructor(s).

Student Management

1. Receive students assigned to the JSEP program.

2. Record and report daily attendance of soldiers.

3. Assist students in using terminals, and in following JSEP procedures.

4. Assist students in the use of Handheld Tutor.

5. Answer student questions concerning terminal operations, JSEP content, policy, and logistics.

6. Monitor test taking to assure test security.

7. Operate the CAI system in student mode:

   a. Sign on new student
   b. Enter relevant entry and test data
   c. Detect student problems with logic of instruction and place student at correct location in instruction.

8. Administer tests and other instruction that may accompany JSEP.

9. Manage JSEP students through the use of information provided in the data management system.

10. Conduct student orientation to JSEP.

11. Accumulate, maintain, and distribute any supplementary material (e.g., required printouts, charts for pacing module, paper and pencil).

12. Operate any equipment used in JSEP such as tape recorders, interactive videodiscs, etc.

13. Prepare for handling computer down time and other extraordinary situations.

14. Maintain any required records in addition to those kept by the computer system.

15. Assist students in selecting appropriate lessons following the data received from diagnostic testing and instructions from contractor and/or Education Center Director.

17. Provide accurate and motivating feedback to students.

18. Document student comments on the lessons and note criticisms or problem areas.

Computer Maintenance

1. Conduct basic troubleshooting and maintenance of video equipment, cassette recorders, videodiscs, computer terminals, and other media equipment.

2. Recognize system errors and problems, and document these.

Instruction

1. Administer pencil and paper tests and interpret results according to lesson specifications.

2. Prescribe appropriate lessons for student according to test results.

3. Direct students to alternate/supplementary learning materials. Perform some basic library and filing functions in order to maintain and track these materials.

4. Administer learning strategy lessons according to specifications.

5. Use a variety of motivational, anxiety reduction, mood management, and problem-solving techniques (as introduced in workshops).

* 6. Teach lessons or skills which cannot be presented or evaluated on the computer.

* 7. Use reinforcement, self-monitoring, and behavioral contracts; counsel students on the application of these techniques to individual situations.

* 8. Use alternate instructional methods, including implementing policies concerning failure and the repetition of lessons.

10. Administer (or assist) posttest.

11. Collect and interpret post-cycle data and provide Education Center requested and/or contractor requested records.

APPENDIX A

Summary of Priority Data

Prerequisite Competency	# of Common Tasks Index	Number of MOS	# Tasks Index	Schools Already Taught %	TRADOC Highest Priority %	Difficulty %	ETS Failure Rate%	FORSCOM Priority	Combo Priority Rating	CET Priority	Forscom Priority
NUMBERING AND COUNTING											
*1a. Match numerals with word names and models	1	95	4	62	27	48	38	11	4	5	2
*1b. Write numerals in sequence from any starting point	1	60	3	45	33	32	02	8	3	4	1
1c. Identify the number that comes before, after or between any two given numbers	1	81	4	52	31	42	33	8	4	3	1
1d. Identify a number which is greater or lesser from a set of numbers	1	69	3	55	32	48	33	8	4	3	1
1e. Identify an object with a specified ordinal position	2	74	3	74	16	42	23	7	3	3	1
*1f. Write or state the place value of a particular digit, whole or decimal number	1	63	3	68	19	48	27	8	3	3	2

Prerequisite Competency	# of Common Tasks Index	Number of MOS	# Tasks Index	Schools Already Taught %	TRADOC Highest Priority %	Difficulty %	ETS Failure Rate %	FORSCOM Priority	Combo Priority Rating	CET Priority	Forscom Priority
1g. *Round a whole or decimal number to a specified place*	0	51	3	47	31	45	57	11	2	5	4
*1h. Count by ones, twos, fives, tens, etc., backward or forward (skip counting)	2	95	4	49	22	41	02	5	3	1	1
1i. Match numbers or points with intervals on scales that can be represented as a number line (with or without numbers)	2	37	3	65	24	41	27	6	3	1	3
LINEAR, WEIGHT, AND VOLUME MEASURES											
2a. Interpret the markings on a linear scale	1	37	3	65	27	46	20 26	12	3	5	4
2b. Identify units of measure in the US standard and Metric System and classify units according to type of measure	2	59	3	56	17	42	100	14	5	5	4

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2c. Measure lengths of objects or distances using a ruler, yard stick, meter stick, or scale	1	77	3	66	22	51	20 47	9	3	3	3
2d. Measure weight (ounces, pounds, grams), pressure (pounds per square inch), and torque (foot pounds)	0	43	3	40	33	47	20	7	2	3	2
2e. Measure items in pints, quarts, liters, and parts of them	1	39	3	46	23	28	20	6	2	3	1
2f. Measure with a non-numerically calibrated scale	1	43	3	70	14	28	75 15	7	3	2	2
2g. Use existing objects or concepts to measure or estimate size or distance	3	90	4	61	16	47	35 55	20	4	3	3

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DEGREE MEASURES											
3a. Identify degrees and mils as units in determining angular measurement or temperature	2	64	3	66	19	52	50 21	12	4	3	5
*3b. Estimate the measure of a given angle not greater than 180 degrees	1	50	3	62	14	18	50 21	12	2	5	5
*3c. Interpret bearings, azimuths, and other contexts in which the measure of an angle may range 0 degrees to 360 degrees or 0 to 6400 mils	1	52	3	54	17	60	34	13	3	5	5
TIME-TELLING MEASURES											
4a. Tell time using digital, analog, and 24 hour clocks	1	59	3	44	25	31	11	10	3	5	2
4b. Use the positions on a clock face to indicate direction	1	71	3	54	25	35	11	8	3	4	1

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*4c. Estimate time in seconds, minutes, and parts of an hour	2	85	3	52	21	27	NT	8	3	4	1
4d. Determine equivalent dates from one calendar form to another using Gregorian and Julian calendars	1	74	3	50	04	36	49	7	3	3	1
*4e. Convert time to hours and tenths of hours	0	22	2	50	23	32	44 76	6	2	3	1
4f. Compute Zulu (Greenwich Mean Time)	0	12	2	75	25	33	44 76	8	2	5	1
GAGE MEASURES											
5a. Read and interpret a gage (numbered, meter, caliper, or feeler)	1	82	4	01	17	54	20 26 43	13	3	5	4
5b. Read and interpret a display read-out	0	63	4	67	11	46	15 94	12	3	5	4

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5c. Interpret a gage with color divisions	1	55	3	64	15	29	15	9	2	3	4
5d. Read and interpret scales with (+) and (-) demarcations	0	40	3	73	13	43	20 26	9	2	3	4
5e. Read and interpret bands on a multiscale gage	0	37	3	78	03	38	20 26	8	1	4	3
5f. Match a gage reading to a specification	1	68	4	74	13	47	20 26 56 91	13	4	5	4
5g. Read and interpret unnumbered or unmarked gage type instruments	1	55	3	62	05	35	20 56	6	2	3	1
5h. Read and interpret a gage which is fluctuating or momenterily sustained	1	55	3	75	05	45	20 56	9	2	5	2

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*5i. Match specifications of required measures by manipulation, alinement, or maintenance	1		59	4	78	02	49	20 38	10	3	4	3
SPATIAL												
*6a. Identify directions that tools, hardware, or components may be moved	3		91	5	77	12	46	18	11	4	5	2
6b. Manipulate objects to aline, make parallel, be perpendicular, or be at an angle	3		91	5	80	04	54	40	10	4	5	1
6c. Interpret distance and directional relationships of figures and objects from two dimensional drawings	1		47	3	64	13	49	31 49	10	4	4	2
6d. Relate symbols and graphic representations to actual systems, subsystems, and components	1		41	3	76	10	51	13	7	2	2	3

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LINES											
7a. Identify, draw and label real or imaginary points, lines, parts of lines (segments) and rays	2	43	3	58	16	56	25	9	3	3	3
7b. Identify, draw, aline, and label parallel, divergent, vertical, horizontal and diagonal lines, laterals, and rays	2	46	3	65	15	61	71	10	4	4	2
7c. Identify and draw intersecting and perpendicular lines	1	27	2	41	30	41	71	8	3	3	2
7d. Aline lines so they are superimposed	0	11	2	45	18	45	15	4	1	1	2
PLANES											
8a. Identify and match plane geometric shapes and plane common shapes	2	36	3	44	14	39	25	11	3	4	4

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8b. Identify characteristics of geometric shapes	0	8	1	38	13	25	25	6	1	2	3
8c. Apply shape terms to objects and plane figures	0	10	2	20	20	80	25	8	2	2	4
8d. Match patterns of figures both actual size and model drawings	1	33	2	58	21	55	15	7	3	3	1
8e. Identify orientation of figures	0	18	2	50	17	44	71	6	2	3	1
ANGLES AND TRIANGLES											
9a. Identify angles and triangles	1	43	3	53	19	47	25	12	3	4	5
9b. Identify vertical, horizontal, adjacent, complimentary, or supplementary angles	0	23	2	61	17	48	46	7	2	3	2

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9c. *Identify right angles and* right, equilateral and isosceles triangles	0	7	2	29	14	29	25	8	1	4	3
9d. Draw altitudes and bisectors of angles and trianges	1	10	2	90	0	20	46	8	2	3	3
9e. Name angles and triangles	0	4	1	50	0	25	50	4	1	2	1
SOLIDS											
*10a. Recognize and match the names of solids with their corresponding figures	1	13	2	54	15	62	25	7	3	3	1
TERMINOLOGY											
11a. Identify shape and position terms	2	70	3	67	11	47	46	9	4	4	1
11b. Match spatial orientation terms with positions	3	66	4	68	11	47	09	10	3	4	3

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ADDITION AND SUBTRACTION											
*12a. Add or subtract multi-digit, positive whole numbers, without carrying or borrowing	1	60	3	43	37	45	0 67	12	3	5	4
12b. Add or subtract whole numbers with carrying and borrowing	1	51	3	51	31	55	0 67	13	3	5	5
12c. Add and subtract decimals with borrowing and carrying	0	43	3	42	51	67	26 67	12	3	4	5
12d. Add or subtract positive and negative numbers	0	49	3	59	22	59	60	10	2	4	4
12e. Add or subtract to find correct time on a 24-hour clock in hours and minutes	1	15	2	53	20	53	44 76		3	4	4
*12f. Add or subtract increments on gauges, dials, and other measuring instruments	1	33	3	70	18	58	44 76	13	3	5	5

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12g. Add, subtract, and regroup linear, dry, liquid or degree measures	0	18	2	67	22	61	44 76	10	2	3	5
*12h. Estimate sum or difference	1	28	2	50	32	39	54	11	3	5	3
MULTIPLICATION AND DIVISION											
*13a. Multiply and divide whole numbers	2	60	3	50	30	57	35	13	4	5	4
13b. Multiply and divide whole and decimal numbers	0	41	3	41	44	59	80	11	3	4	4
13c. Divide numbers with decimals in both divisor and dividend	0	6	1	50	50	83	80	11	3	3	5
13d. Multiply and divide negative and positive numbers	0	36	2	42	17	58	83	11	2	4	5
*13e. Estimate a product or quotient	0	25	2	44	28	44	54	9	2	4	3

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FRACTIONS/DECIMALS											
14a. Estimate fractional length, distance, area, and volume	2	69	4	54	25	43	38	12	3	5	4
*14b. Reduce fractions to lowest terms	0	6	1	50	17	50	33	8	2	2	4
*14c. Convert fractions (proper and improper) to decimal equivalents, and vice versa, using a table, chart, or gage	0	18	2	17	33	56	64	8	3	3	2
14d. Convert percentages to fractions and decimals, and vice versa	1	54	2	39	28	61	64	14	4	5	5
*14e. Add and subtract fractions, with same or different denominators	0	20	2	25	40	55	79 67	11	3	3	5
*14f. Multiply and divide fractions with and without whole numbers	0	13	1	15	38	69	71 67	11	3	3	5

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*14g. Estimate a fractional sum, product, or quotient	0	22	2	55	32	55	54	8	2	4	2
GEOMETRY											
15a. Draw plane geometric figures	1	35	3	43	20	34	25	7	3	3	1
15b. Match geometric figures with word names	1	61	3	54	18	46	25	12	3	4	5
15c. Label specified objects	0	8	2	63	0	38	NT	7	1	4	2
15d. Use a protractor and a straightedge	1	47	2	70	11	60	50	9	3	4	2
15e. Construct or draw perpendicular lines	0	3	1	100	0	67	71	6	2	3	1
15f. Compute the area and perimeter of a circle or rectangle	0	22	2	36	27	64	76 21	11	3	3	5

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15g. Determine area, radius and circumference of a circle	0	6	1	0	50	50	96	11	3	4	4
15h. Measure rectangular shaped solids	0	3	1	33	33	67	76 21	9	3	4	2
15i. Use formulas to solve problems involving geometric figures	0	7	1	43	43	57	76 21	12	3	4	5
15j. Solve problems involving oscilloscope readouts or maps	0	34	3	62	09	56	31 49	8	2	3	3
COMBINATION OF PROCESSES											
16a. Locate the center of an object	0	5	1	60	40	60	0	4	2	1	1
*16b. Compute averages	1	27	2	33	33	59	67	12	4	5	3
16c. Solve problems combining all processes, using whole numbers, mixed numbers, and fractions	0	13	2	54	31	77	83	13	3	5	5

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*16d. Solve problems, combining all processes involving units of measurement	0		14	2	64	21	57	44 76	10	2	3	5
16e. Identify and use information from charts, number lines, scales and graphs to solve arithmetic problems	0		17	2	59	24	53	44 76	10	2	3	5
16f. Solve conversion problems	0		32	2	44	38	69	44 76	13	3	5	5
*16g. Solve problems involving ratio and proportion	1		37	3	51	16	59	39	12	3	4	5
16h. Solve word problems involving any mathematical process	0		6	2	67	33	67	44 76	11	3	3	5
GRAPHING IN THE COORDINATE PLANE												
*17a. Identify grid coordinates on a military map	1		39	3	67	10	54	32	12	3	5	4

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*17b. Specify the 6 digit coordinates of any intersection of lines on a military map	2	34	3	65	15	50	57	12	3	5	4	
17c. Plot a point at an intersection of a grid when distance and directions are specified	0	3	1	67	33	33	100	10	3	3	4	
ALGEBRA												
18a. Solve simple algebraic equations in one unknown	0	27	2	67	22	74	55	12	2	5	5	
18b. Derive equivalent algebraic equations	0	3	1	100	0	100	100	10	3	3	4	
18c. Calculate power and square root with the aid of a pocket calculator	0	4	1	75	0	50	90 54	6	2	3	1	
TRIGONOMETRY												
*19a. Use tables of trigonometric functions	0	3	2	100	0	100	93	4	3	1	1	

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19b. Use tables of logarithms to solve multiplication and division problems	0		4	2		75	0	75	100 54 100	4	2	1	1
19c. Calculate the length of a side of a triangle using trigonometric functions	0		3	2		100	0	100	100 100	5	3	1	1
19d. Use trigonometric functions to solve geomtric problems	0		2	1		100	0	100	100 100	5	3	1	1
PROCEDURAL DIRECTIONS													
25a. Follow directions to complete a task activity which involves reading, observation, identification and/or comparison	1		92	4		71	20	60	04	3	3	5	5
*25b. Select parts of text and visual materials to complete a task activity	1		85	4		73	14	59	08	13	3	5	5
*25c. Follow highly-detailed, step-by-step directions in order to accomplish a sequence of task activities	1		91	4		79	13	69	14	12	3	4	5

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25d. Determine the essential message (main idea) of job-related material	0	48	3	63	29	81	14	10	2	3	5
25e. Select appropriate decision or course of action in a specified situation	0	48	3	52	15	65	24	11	2	4	5
25f. Synthesize information from written and/or oral sources in order to complete a task or activity	0	33	3	61	27	61	52	11	3	3	5
VOCABULARY											
*26a. Recognize the meaning of common words	3	64	4	61	31	44	01	13	3	5	5
26b. Recognize the meaning of task-related technical words	3	76	4	89	04	55	36	13	3	5	5

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*26c. Identify the correct meaning of a word from the context of a sentence	1	55	3	60	33	49	07	13	3	5	5
*26d. Recognize the meaning of common contractions, abbreviations, and acronyms	2	84	4	74	13	54	07	9	3	4	2
*26e. Determine the meaning of figurative and idiomatic terms	1	77	3	70	13	49	02	9	3	5	1
REFERENCE SKILLS											
27a. Locate documents by code number and title	1	90	4	77	08	53	0	10	3	3	1
27b. Locate and file information alphabetically and alphanumerically	0	49	3	47	18	37	0	6	1	1	4

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27c. Locate information in a book or manual by using the table of contents, index, appendix, and glossary	1	77	3	84	09	57	0	10	3	2	5
*27d. Locate the title, page, paragraph, figure, or chart needed to answer a question or to solve a problem	2	77	4	77	09	55	0	11	3	3	5
*27e. Skim or scan for relevant information	1	69	3	46	29	59	08	12	3	4	5
27f. Use cross references to locate information	1	71	3	69	07	62	52	12	3	3	5
27g. Organize information from multiple sources	0	42	3	69	12	57	52	8	2	3	3

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TABLES/CHARTS											
*28a. Obtain a fact or specification from a two-column table or chart to find information	1	81	3	74	06	59	0	10	3	4	3
*28b. Obtain a fact or specification from an intersection of a row-by-column table or chart	1	94	3	76	09	55	0	10	3	4	3
*28c. Use a complex table or chart requiring cross-referencing within or in combination with text material outside the chart	0	66	3	74	08	64	38	7	2	2	3
*28d. Apply information from tables and charts for locating malfunctions, or for selecting a course of action	1	84	4	77	05	61	0	11	3	5	3

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ILLUSTRATIONS											
29a-1. Identify details, labels, numbers, and parts from an illustration	2	84	4	75	14	51	0	11	3	5	3
a-2. Use a map to identify and communicate details of terrain or layout								12	3	5	4
29b. Identify details, labels, numbers, and parts according to a key, legend, or list	2	54	3	83	13	61	04	11	3	4	4
29c. Use a cross-sectional view of an object for assembly or disassembly	1	39	3	79	10	67	0	10	3	3	4
29d. Use a three dimensional projection or exploded view of objects to perform an action or complete a procedure	1	31	3	61	0	58	0	7	2	2	3
29e. Use an illustration or sequence of illustrations to follow directions.	1	49	3	69	18	51	04	9	2	3	4

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29f. Integrate visual information from various sources to select a course of action	0	45	2	67	16	51	52	7	2	3	2
FLOW CHARTS											
30a. Identify the meanings of symbols on a flow chart	0	9	2	78	0	44	07	4	1	2	1
30b. Use a flow chart to make a procedural decision	0	22	3	64	09	59	47	7	2	4	1
30c. Use a chart to identify organization members	0	4	3	75	0	75	NT	6	2	3	1

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SCHEMATICS											
31a. Use a block, schematic, or wiring diagram to identify subsystems and major functional components of equipment	0	18	3	89	0	61	13	7	1	4	2
31b. Identify components and signal paths of a symbolic configuration	0	19	3	84	05	68	13	6	1	3	2
31c. Trace circuit connections from one designated point to another within a schematic diagram	0	19	3	95	05	74	13	6	1	3	2
31d. Identify possible faulty components of a subsystem	0	14	3	93	0	64	13	8	1	4	3
31e. Identify symbols that indicate components, signal paths, and test points on a schematic or wiring diagram	0	16	3	81	0	69	13	8	1	4	3

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FORMS											
*32a. Locate the block on a form to enter appropriate information	1	77	4	86	08	48	07	10	3	4	3
*32b. Transfer a number, code, date, figure, or related data from equipment or written sources onto an appropriate section of a form	1	79	4	82	06	44	07	10	3	4	3
*32c. Write the names of the organization, responsible personnel, disposition of the part or equipment, and nomenclature, in appropriate sections of a form	1	75	4	77	07	45	07	11	3	4	4
*32d. Write a descriptive account of an activity or transaction performed	1	78	4	72	14	51	47	10	4	4	2
*32e. Use a completed form to locate or compare information	1	86	4	74	07	55	04	11	3	4	2

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NOTE-TAKING											
33a. Record essential information	0	38	3	55	26	53	68	7	3	3	1
33b. Assure accuracy and precision when recording information	1	67	3	60	18	63	16	9	3	4	2
33c. Record information into sentence form	0	14	2	21	29	50	39	5	2	1	2
33d. Record information that involves more than one sentence	0	8	1	50	0	25	64	6	2	3	1
OUTLINING (topic or sentence)											
34a. Identify the main topic and supporting details	0	5	1	40	20	60	21	7	2	3	2

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34b. Select appropriate details to support the main topic	0	8	2	25	50	63	21	8	3	3	2
34c. Generate titles for each section of the outline	0	4	2	50	50	75	21	6	3	2	1
34d. Use numbers and letters to label topics in an outline	1	5	1	20	0	40	0	7	2	4	1
REPORT WRITING											
35a. Generate the title, objectives, report intent, target audience, and all essential and supporting details of a written report	0	12	2	42	25	58	17	7	2	3	2
35b. Summarize the essential details of a report by answering the questions who, what, when, where, and how, as appropriate	1	20	2	40	10	40	11	7	1	3	3

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35c. Write a report which includes only relevant details	0		24	2	50	25	54	08	9	2	3	4
35d. Generate a written report, arranging the events sequentially	1		17	2	53	24	47	06	9	3	3	3
35e. State general impressions of an event or situation as they relate to specific reporting goals	1		13	2	46	23	31	07	8	2	3	3
35f. Write a report including necessary support documentation, or classification	1		8	1	25	13	50	08	6	2	3	1
35g. Summarize events and precise dialog in an accurate, complete, and objective manner	0		1	2	1	0	0	43	5	1	2	2
35h. Summarize the major points presented in a written report	1		14	1	14	29	57	12	8	3	3	2

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35l. Write a report that justifies actions taken and provides good reasons for rejecting alternative actions	0	4	1	50	25	25	48	5	2	2	1
EDITING											
*36a. Spell frequently used words correctly	0	12	2	33	33	33	25	7	2	4	1
*36b. Spell task-related words correctly	0	47	2	30	23	53	61	9	2	5	2
*36c. Identify words that need to be capitalized	0	5	2	20	40	80	26	11	2	4	4
36d. Use a reference source to correct misspellings.	0	15	2	20	20	67	25	9	2	3	4
*36e. Apply all rules for endmarks, commas, and apostrophes	0	10	2	30	60	90	26	8	2	3	3

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*36f. Apply common rules of grammar	0	13	1	46	23	54	36	10	2	4	4
36g. Rewrite a paragraph stating the main idea in a topic sentence, and restructure for sequence and coherence	0	2	1	50	50	50	64	7	3	1	3
*36h. Appraise a written communication and make adjustments to improve clarity	0	31	2	39	16	35	32	7	1	3	3
PRECAUTIONS											
40a. Use common knowledge to prevent injury to self or equipment	3	90	4	79	06	50	0	10	3	3	4
40b. Apply preventive measures to minimize potential safety or security problems	3	87	4	85	02	51	0	8	3	1	4

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40c. Identify appropriate course or action in specific emergency situations	2	58	3	79	02	50	01	9	3	3	3
RECOGNITION											
41a. Identify and label objects by their geometric shape, technical purpose, and similarity to other shapes	3	90	4	81	08	53	0	8	3	3	2
41b. Use and interpret hand and arm signals	1	62	3	55	02	34	0	8	2	4	2
41c. Identify damage to or defects in equipment	3	77	4	86	01	51	0	10	3	4	3
41d. Move, aline, and connect objects	2	78	4	74	12	42	0	6	3	1	2
41e. Identify objects by size, shape, color and markings	3	90	4	76	08	48	01	9	3	3	3

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41f. Identify stimuli	2	90	4	63	06	42	NT	6	3	2	1
41g. Use sight, hearing, or touch to determine a course of action	3	88	5	68	05	44	NT	8	3	3	2
41h. Interpret and use symbols and codes	1	69	3	83	13	48	0	12	3	5	4